

Hydrogen Safety 2020

Held at the 2020 AIChE Spring Meeting and 16th Global
Congress on Process Safety

Online
17 - 21 August 2020

ISBN: 978-1-7138-2331-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2020) by AIChE
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact AIChE
at the address below.

AIChE
120 Wall Street, FL 23
New York, NY 10005-4020

Phone: (800) 242-4363
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

(1A) 2020 AICHE SPRING MEETING & 16TH GCPS AGILE AWARD KEYNOTE ADDRESS - BEYOND THE HORIZON: THE FACTORS AND FORCES AFFECTING THE GLOBAL PETROCHEMICAL INDUSTRY	1
<i>Bhavesh V. (Bob) Patel</i>	
(16A) SECURING ENTERPRISES VIA CYBERSECURITY UNDERSTANDING, RESILIENCY, AND EDUCATION	2
<i>Matt Loeb</i>	
(179A) WHEN DISASTERS HAPPEN: A COLLABORATIVE APPROACH TOWARDS THE COMMUNITY'S RECOVERY PROCESS	3
<i>Thomas Munoz</i>	
(71C) HYDROGEN AS A VECTOR FOR THE ENERGY TRANSITION	4
<i>Joseph B. Powell</i>	
(90A) ANALYSIS OF HYDROGEN CYLINDER EXPLOSION ACCIDENTS AND SAFETY DISPOSITION OF REMAINING CYLINDERS	5
<i>Xiangzhi Kong, Gang Tao</i>	
(90B) TUBULAR HIGH TEMPERATURE PEM FUEL CELL WITH NOVEL 3D-PRINTED METALLIC POROUS ANODE GAS DIFFUSION LAYER: FABRICATION, MODEL DEVELOPMENT AND VALIDATION	6
<i>María Catalina Bermúdez Agudelo, Aaron D. Ratschow, Manfred J. Hampe</i>	
(90C) A NOVEL APPROACH FOR DESIGN AND QUANTITATIVE RISK ASSESSMENT FOR HYDROGEN REFUELING STATION	16
<i>Nilesh Ade, Benjamin Wilhite</i>	
(60A) PROCESS AND ADSORBENT FOR SEPARATING ETHANOL AND ASSOCIATED OXYGENATES FROM A BIOFERMENTATION SYSTEM.....	17
<i>Deepak Sharma</i>	
(60B) PUMP SAFETY, THE UNDISCUSSED TOPIC IN CHEMICAL INDUSTRY LEADING TO SEVERAL FATAL INCIDENTS	18
<i>Deepak Sharma</i>	
(60F) NEW KIND OF LINEAR NANOCOMPOSITE APPLIED IN IMPROVING RHEOLOGICAL BEHAVIOR OF CRUDE OIL AND ITS MECHANISM STUDIED THROUGH MOLECULAR SIMULATION METHOD	19
<i>Zheng Peng, Wei Wang, Weijie Yu, Huirong Huang, Jing Gong</i>	
(60G) SOLAR ENERGY CONVERSION AND NOISE CHARACTERIZATION SENSING IN BUILDING INTEGRATED SOLAR PHOTOVOLTAIC DEVICES WITH VENTILATION	20
<i>Himanshu Dehra</i>	
(60H) STRUCTURAL CHARACTERIZATION AND MODEL REPRESENTATION OF VITRINITE-RICH INDIA COAL BY USING ADVANCED ANALYTICAL TECHNIQUES	21
<i>Yash Jaiswal, Sunderlal Pal</i>	
(60K) LIFE MANAGEMENT OF HIGH ENERGY PIPING WITH HIGHLIGHTS FROM ASME B31.1	22
<i>Ben Ruchte, Wendy Weiss</i>	

(60O) OPTIMIZATION OF C3MR LNG LIQUEFACTION PROCESS USING A PARALLELIZED SIMULATOR	23
<i>Trevor Rice, Yoshitsugi Kikkawa, Mingder Lu</i>	
(60P) MODIFYING FISCHER-TROPSCH REACTION SEQUENCE WITH ADDITION OF ZEOLITE TO IRON-BASED ACTIVATED-CARBON SUPPORTED CATALYST	24
<i>Avinashkumar Karre</i>	
(60T) LATERAL RETENTION FORCE REQUIRED FOR SLIDING SALINE DROPLETS OVER SILIANIZED SILICON SURFACE	25
<i>Yagna Valkya Reddy Bhimavarapu, Appu Vinod, Akash Jena, Rafael Tadmor</i>	
(60U) STUDY OF DROPLET MOTION ACROSS POLYMERIC SUBSTRATES BY CENTRIFUGAL ADHESION BALANCE (CAB)	26
<i>Akash Jena, Yagna Valkya Reddy Bhimavarapu, Appu Vinod, Sirui Tang, Rafael Tadmor</i>	
(60W) POPULATION BALANCE MODELING AND SPATIALLY-ORIENTED CONTROL FOR CRYSTAL SIZE AND SHAPE IN CRYSTALLIZATION PROCESSES	27
<i>Marcellus G. F. De Moraes, Martha A. Grover, Argimiro Resende Secchi, Maurício B. De Souza Jr., Paulo L. C. Lage</i>	
(60AE) AUDITING THE PROCESS HAZARD ANALYSIS - KEY CHARACTERISTICS TO SCRUTINIZE IN A GOOD-QUALITY HAZOP STUDY AND SUPPORTING EFFECTIVE HAZOP STUDY UPDATES	29
<i>Steven T. Maher</i>	
(60AF) DEVELOPMENT OF HIGH PERFORMANCE ORGANIC-BASED CATHODES	30
<i>Sarwan S. Sandhu, Joseph P. Fellner</i>	
(60AK) ELECTROCHEMICAL KINETICS OF DEGRADATION OF GRAPHITE ANODES IN LITHIUM ION BATTERIES.....	31
<i>Supratim Das, Martin Z. Bazant</i>	
(60AU) MODEL DEVELOPMENT OF SOLID OXIDE FUEL CELL THERMAL PERFORMANCE USING ARTIFICIAL NEURAL NETWORK	33
<i>Mohammad Biswas, Kamwana Mwara</i>	
(60AW) IMPACT OF SPACER NATURE ON RHEOLOGICAL PROPERTIES OF CATIONIC GEMINI SURFACTANT	34
<i>Shams Kalam, Muhammad Shahzad Kamal, Shirish Patil, S. M. Shakil Hussain</i>	
(60AX) REAL TIME ENERGY MANAGEMENT SYSTEMS IMPLEMENTATION FOR CONTINUALLY OPTIMIZED PERFORMANCE.....	35
<i>Pablo Montagna</i>	
(60AN) ANALYSIS OF FUEL CELL SYSTEM THROUGH PROJECT BASED LEARNING FOR APPLICATION OF CLASSICAL THERMAL FLUID CONCEPTS IN MECHANICAL ENGINEERING LABORATORY COURSE	36
<i>Mohammad Biswas</i>	
(60BD) MEASURED VERSUS CALCULATED SOUR GAS PROPERTIES	37
<i>Nasrin Nasimi</i>	
(60BL) THE STUDY OF A S-CO ₂ OXY-FUEL COMBUSTION POWER PLANT FOR LOW GRADE COALS	38
<i>Hyung Woo Kim, Su Been Seo, Seo Young Kang, Eun Sol Go, See Hoon Lee</i>	

(60BM) CHARACTERIZATION AND PERFORMANCE ASSESSMENT OF OIL ENTRAPMENT BY COMMERCIALY AVAILABLE SURFACTANTS.....	39
<i>Julia Siqueira, Lauren Ritz, Shuchen Li, Curtis W. Jarand, Wayne F. Reed</i>	
(60BN) DESIGNING A NATIVE MODEL FOR ASSESSMENT OF THE EFFECTIVENESS OF ADVERTISING	40
<i>Sorush Niknamian</i>	
(60BO) STUDY OF NATURAL ANTIOXIDENT INHIBITORS FOR CORROSION PROTECTION OF MILD STEEL IN ACIDIC MEDIUM.....	76
<i>Ibtihal Albahrani</i>	
(60BP) VERIFICATION OF FIREFIGHTERS' HEURISTICS AND PREDICTIVE MODEL DEVELOPMENT THROUGH BIG DATA ANALYSIS.....	85
<i>Sohyeon Park, Eunji Shin, Dongil Peter Shin, Jeonghoon Park</i>	
(60BT) CONVERTING SHELTER-IN-PLACE LOCATIONS TO ZERO VULNERABILITY SAFE HAVENS	86
<i>James Rau, Ashlee Young, Meghan McDermott</i>	
(60BW) HOW THE FIELD OF HUMAN FACTORS HELPS SOLVE THE RIDDLE OF SERIOUS INJURIES AND FATALITIES	100
<i>Chason Coelho, Sunil Lakhiani, Delmar Trey Morrison</i>	
(60BX) INITIAL CONDITIONS USED IN ATMOSPHERIC DISPERSION MODELS:ISSUES WITH COMMONLY USED ASSUMPTIONS FOR GAS JETS AND PLUMES	101
<i>Thomas O. Spicer III, Chad T. Smith</i>	
(60BZ) FAULT TREE UNCERTAINTY ANALYSIS.....	102
<i>Raymond Randy Freeman</i>	
(60CD) MAKING THE MOST OF YOUR PHA	132
<i>Steven T. Maher, Morgan McVey</i>	
(60CN) THEORETICAL ANALYSIS OF THE VIABILITY OF ISOPROPANOL- CYCLOHEXANE SOLVENT SYSTEMS FOR BIOMATTER LIPID EXTRACTION.....	133
<i>Kyle Zappi</i>	
(60CO) TECHNO-ECONOMIC ANALYSIS OF THE CONVERSION OF CH ₄ AND CO ₂ INTOACETIC ACID USING MICROWAVE PLASMA	134
<i>Abdulrahman S. Alsuhaibani, Marco Avendano, Mahmoud El-Halwagi</i>	
(60CQ) MODEL PREDICTIVE CONTROL DESIGN FOR THE ALLAM POWER PLANT INTEGRATED WITH AN AIR SEPARATION UNIT.....	135
<i>Dan Fernandes, Md Emdadul Haque, Song Wang, Daniel Chen, Srinivas Palanki</i>	
(60CR) EXPLORE THE FUNCTION OF ION-EXCHANGE MEMBRANE (IEM) IN MEMBRANE CAPACITIVE DEIONIZATION (MCDI) CELL, AN ALTERNATIVE TECHNIQUE IN BRACKISH WATER DESALINATION FIELD	136
<i>Xin Zhang, Danny Reible</i>	
(60CT) AN INTEGRATED PROCESS FOR THE PRODUCTION OF PROPYLENE GLYCOL FROM SHALE GAS	137
<i>Md Emdadul Haque, Namit Tripathi, Qiang Xu, Srinivas Palanki</i>	

(60DC) MONITORING METHODS FOR FAULT DETECTION AND DIAGNOSIS: ALGORITHMS AND APPLICATIONS	138
<i>M. Ziyah Sheriff</i>	
(60DE) SELECTIVE SEPARATION OF INDUSTRIAL RELEVANT METAL IONS FROM HIGH TDS WATER USING WAFER-ENHANCED ELECTRODEIONIZATION (WE-EDI)	139
<i>Humeyra B. Ulusoy Erol</i>	
(60DF) INFLUENCE OF PARTICLES ON AMINE LOSSES DURING CO ₂ CAPTURE: A PROCESS SIMULATION COUPLED AEROSOL DYNAMICS MODEL _	140
<i>David Dhanraj</i>	

Author Index